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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE.



JULY 1, 1933

Camera Study of Prehistoric American

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Summary of Science

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DO YOU KNOW?

Hawks and eagles are said to sleep standing up.

Accident statistics show that July 4 is by far the most dangerous day in the year.

There are desert mice that have spines, like a porcupine's, growing among their fur.

It is estimated that the farmers' reduced purchasing power has cost four million city men their jobs.

Portugal has marked six tuna fish and released them in the hope of getting information on migratory habits of the tuna.

Some of the newest museum cases are made of glass plates cemented together, so that no wood or metal edges interfere with complete vision.

California scientists have discovered that a pestiferous black gnat that infests part of the Sacramento Valley is a new species, and they are now hunting a name for it.

The largest ice cap in Europe is Vatnajokull in southeast Iceland, with an area of 3,400 square miles.

When Spanish explorers discovered tobacco in America, they carried back seeds and grew the plant as a curiosity.

Washable evening slippers are the latest possibility through the development of a new waterproof cloth in gold, silver and copper finishes.

A Chinese jade carving exhibited in Chicago is a pagoda 51 inches high carved out of a single piece of jade and representing 16 years of continuous work.

Tortoises are noted for their long lives, but a well-known expert on reptiles believes that crocodilians probably are the longest-lived creatures on earth.

Following a recent windstorm in Louisiana it was reported that a red rooster was carried 30 miles and deposited safely on a farm in another parish.

WITH THE SCIENCES THIS WEEK

ANATOMY

At what age does the human brain reach adult size? p. 4.

ARCHAEOLOGY

How large an area is covered by the newly-discovered Mayan ruins? p. 5. *The History of the Maya*—Thomas Gann and J. Eric Thompson—Scribner, 1931 \$2.50.

What was the Mayan national sport? p. 15.

ASTRONOMY

Do variable stars radiate most energy when they are brightest? p. 3.

How many planets can be seen during July? p. 6. *A Guide to the Constellations*—S. G. Barton and W. H. Barion—McGraw-Hill, 1928, \$2.50.

BACTERIOLOGY

How may tomato seed be freed of bacterial canker? p. 14.

ENTOMOLOGY

How do insects breathe? p. 14.

How may the sexes be combined in one butterfly? p. 3.

GEOLOGY

When did the last great ice sheet leave North America and Europe? p. 4. *Ice Ages Recent and Modern*—A. P. Coleman—Macmillan, 1926, \$4.

HOME ECONOMICS

Can scientifically correct clothes for children be bought? p. 9. *Bibliography on the Relation of Clothing to Health*—Ruth O'Brien, Esther C. Peterson and Ruby K. Warner—Govt. Print. Off., 1929, 25c.

MEDICINE

Can hardening of brain arteries cause epilepsy? p. 13. *Treatment of Epilepsy*—Fritz B. Talbot—Macmillan, 1930 \$4.

What happens to a person suffering a lack of sugar? p. 5.

NUTRITION

How long has it taken good food to improve the American people? p. 4.

PHYSICS

What is the energy of cosmic rays? p. 3.

What is the heaviest element smashed by atomic bombardment? p. 3.

What does the newly-found heavy-weight hydrogen atom weigh? p. 10.

PHYSICS-GEOLOGY

What happens to earth materials at high pressures? p. 12.

PHYSIOLOGY

How many nerve cells are in the cerebral cortex of the brain? p. 8.

PSYCHOLOGY

Can your intelligence be changed? p. 9.

ZOOLOGY

What frogs dislike water? p. 7.

These curiosity-arousing questions show as a glance the wide field of scientific activity from which this week's news comes. Book references in italic type are not sources of information of the article, but are references for further reading. Books cited can be supplied by Book Dept., Science News Letter, at publishers' prices, prepaid in the United States.

PHYSICS

Successes in Atom Smashing Evaluated by Dr. Millikan

Heat of Sun and Stars Comes From Upbuilding Rather Than Annihilation of Atoms is View Now Gaining Acceptance

THE SUCCESS of recent atom-smashing experiments in upholding the famous Einstein equation for the equivalence of mass and energy gives fresh hope that the origin of cosmic rays in inter-galactic spaces is due to the building of heavy atoms out of energy-created hydrogen "cosmic ray dust."

Dr. R. A. Millikan of the California Institute of Technology re-assayed facts and theories in the light of recent developments when he presented to the American Association for the Advancement of Science's Century of Progress meeting at Chicago new results from his famous Pasadena laboratories. Speaking from the same platform as Dr. F. W. Aston, the British chemist who may be called the father of the isotopes, Dr. Millikan observed that Dr. Aston's success in measuring the exact masses of the elements gave the first quantitative information about the changes that occur inside the atomic hearts, which physicists are now studying so intently in order to solve the riddles of matter and energy.

Drs. Aston and Millikan are both Nobel Prize winners and they have gathered about them in two centers of physics, Cambridge and Pasadena, fruitful groups of associates.

Citing particularly the work of Prof. E. O. Lawrence, of the University of California, as an example of the experimental verification of Einstein's radiation-mass relationship in atom-smashing experiments, Dr. Millikan then applied the theories of Einstein and Aston to the cosmic rays.

Since 1925 Dr. Millikan and his group of experimentalists have been studying cosmic rays, and in the past four years special attention has been given to measurements of their energies. It was during this work last fall that Dr. Carl D. Anderson discovered that cosmic rays being absorbed by the nuclei of atoms give off a new kind of fundamental particle, a positive electron or positron.

At Chicago, Dr. Millikan incidental-

ly presented the first quantitative measurement of the mass of the positron. Dr. Anderson has just found that its mass is the same as the mass of the more familiar negative electron to within about thirty per cent., which is a very accurate measurement when it is remembered that the mass of the proton, or atomic hydrogen heart, is some two thousand times that of the electron.

The cosmic ray energy measurements lie between a hundred million and three billion volts, with positive and negative energies (Turn to Page 15)

ENTOMOLOGY

Rare Butterfly Specimen Is Half Male, Half Female

IN THE butterflies the two sexes are ordinarily in different individuals which are either wholly male or wholly female. But as in all other animals in which the sexes are in separate individuals it occasionally happens that nature makes a mistake and combines both sexes in the same individual.

Two-sexed individuals among the butterflies are very rare, but a considerable number have been recorded. In most of these one side is male and the other

side is female. Sometimes the sexes are combined in other ways, for instance parts of the wings sometimes show the male color pattern and other parts the female. But such combinations are inconspicuous in life so that they are seldom recognized and caught.

The picture below represents one of the common butterflies belonging to the group known as the skippers, in which the wings of the right side are male and in color mostly bright yellow, and those of the left side are female and are of a dull olive green. The two sexes are separated by a line down the middle of the body.

This individual, enlarged in picture, was captured at Cabin John, Maryland, and is now in the National Museum.

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PHYSICS

Neon Atoms Smashed, Producing Rare Isotope

SMASHING atoms of neon, the once rare but now familiar gas, by the action of speeding neutrons, has been accomplished in the physics laboratories of the University of Chicago, by Dr. D. M. Gans, H. W. Newson and Prof. W. D. Harkins, a report to the American Association for the Advancement of Science reveals.

Neon is the heaviest element that has so far broken down under atomic bombardment. The products of its disintegration were helium and oxygen, mass 17. This particular type, or isotope, of oxygen is the rarest of the three isotopes now known. Most oxygen has a mass or atomic weight of 16. There is another isotope of mass 18.

Science News Letter, July 1, 1933



TWO IN ONE

NUTRITION

American Physique Superior Because Better Food Eaten

But Small-Income American Family Still Buys Poor Selection Of Foods, Reports to Home Economics Association Reveal

BETTER feeding of the American people, whether accidental or planned, has actually produced a people of better physique within a few decades.

This view was expressed before the American Home Economics Association by Prof. Agnes Fay Morgan of the University of California.

Citing achievements deriving in part at least from better food, Prof. Morgan named:

1. Vastly improved infant health and survival.
2. Lowered mortality and morbidity at all ages.
3. Accelerated rates of growth in children.
4. More comfortable as well as longer deferred and longer lasting old age.

There remain, Prof. Morgan said, three pressing problems which may be of nutritional origin. These are still to be solved:

1. The prevention and cure of malignant growths.
2. The control of susceptibility to infectious diseases.

3. The prevention of the circulatory and metabolic diseases which are now one of the chief causes of death of middle aged and elderly people.

Despite the chorus of nutrition workers, telling the world over and over what a balanced diet should be, the American family with small income still buys a poor assortment of foods.

This is the evidence from a check-up on foods chosen by 25 families of unemployed in Berkeley, California. The families received grocery orders for a certain money value.

Ruth Okey of the University of California said in reporting the result that the grocery slips showed too many sweets and fats and too few foods containing vitamins, especially vitamin B.

"The families were probably of higher intelligence than the average," she said, "hence the findings indicate very poor choice of food in the American family on a low income level."

The amounts of the orders were said to be generous in comparison with most relief schedules at the present time.

Science News Letter, July 1, 1933

ANATOMY

Six-Year-Old Children Have Brains of Adult Size

WHEN a child reaches the age of six, his brain has grown to approximately its full adult size, scientists learned from a report by Drs. Y. T. Loo and T. Wingate Todd, of Western Reserve University, to the American Association for the Advancement of Science.

Although it takes the human body about 20 years to reach its adult size, the brain takes only six and in better nurtured children only about four.

By this time the child has also attained adult mental capacity, the investigators conclude, and it remains only to

convert this potential capacity into ability by learning and experience throughout the school and college period.

Parts of the brain are fully developed even before the child reaches kindergarten age. The parts of the cerebrum which govern vision and hearing are fully grown and developed by the end of the first year, the scientists reported.

The area of the brain where memories are stored, and the area devoted to learning, grows vigorously from soon after birth, but has made its greatest changes before the child is two years old. The area utilized in attention and concentra-

tion, on the other hand, makes its most vigorous progress between two and six years.

The investigators have been hampered in their study of development of the various parts of the brain by the fact that the brains studied are of dead and therefore defective children. Unless death is swift and accidental, the child has suffered through an illness that may have affected the brain as well as all other parts of the body.

Psychological tests on living children, however, give results in harmony with these examinations of the brain, the investigators said.

Science News Letter, July 1, 1933

GEOLOGY

Temperature of Ground Dates Last Ice Age

WITH a thermometer in the depths of a Wisconsin copper mine as their "calendar of prehistory," two geologists have estimated that the last ice age withdrew from northern Wisconsin twenty or thirty thousand years ago. The scientists, Drs. W. O. Hotchkiss, president of Michigan College of Mining and Technology, and L. R. Ingersoll, of the University of Wisconsin, told the American Association for the Advancement of Science how they obtained their data and made calculations.

The new figure is much less than the estimated period since the Niagara Falls region was free of a continental glacier. It is greater than the seven or eight thousand years European geologists have determined from studies of layers of sediment as the time since the retreat of the last ice sheet from parts of Norway and Sweden. But it does agree roughly, as geological time is approximated, with the dates set for the retreat of the last great ice shelf from Europe and North America.

The temperature measurements, which were made at levels 500 feet apart to a depth of one mile, also indicate that the melting of the ice "was followed, perhaps after several thousand years, by a period distinctly warmer than the present, which was succeeded in turn by one slightly cooler and lasting until rather recent times." Only the average temperature of the ground varied in this manner, it was pointed out, while the average air temperature could have been different.

Accuracy depends on the assumption that the last ice sheet covered the site for about 50,000 years.

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MEDICINE

Tumor of Pancreas Believed Cause of Much Mental Illness

Operations Relieve Patients Apparently Suffering From Epilepsy and Other Mental Disorders

MANY SUFFERERS from mental disorders might be restored to their right minds by surgical operations removing tumors of the pancreas, a report to the American Association for the Advancement of Science reveals.

These patients have a disease that is practically the opposite of diabetes, Dr. Evarts A. Graham of Washington University of Medicine, St. Louis, declared. They suffer from a lack of sugar caused by the presence of too much insulin, which rapidly uses up the sugar of the body, Dr. Graham explained. He pointed out that certain tumors of the pancreas have been found to be responsible for stimulating the secretion of insulin to over-production.

Convulsions, often mistaken for epilepsy, and mental confusion resembling that of alcoholic intoxication result from this lack of sugar, Dr. Graham said; consequently, many persons who have this condition consult a neurologist first.

"One is forced to wonder," he continued, "how many patients there are in our mental institutions suffering supposedly from epilepsy and other mental disorders who perhaps really have pancreatic tumors of this type which could be removed with a satisfactory disappearance of the symptoms. This condition is undoubtedly much more common than the few reported cases would indicate."

Sometimes Cancerous

"Sometimes these tumors of the pancreas are cancers," the surgeon explained, "but many of them are benign (adenomas) which after removal do not return. It is interesting that seven cases have been reported in which a tumor of this tissue has been diagnosed and removed successfully. Three of these patients have been operated on at the Barnes Hospital, St. Louis. One of our own cases is unique in the fact that after the removal of one tumor it was necessary to perform a second operation a few weeks later to remove a second tumor. In all of these instances the

patient has made a successful recovery from his symptoms."

The tumors originate in tissue which forms the so-called islets of Langerhans of the pancreas. This is the tissue which produces insulin, the substance that patients suffering from diabetes lack.

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ARCHAEOLOGY

Vast Mayan Ruins Found by Briton

HITHERTO unknown ruins of a vast center of Mayan civilization, where a dense population once lived, have been discovered in the jungle of Yucatan. Dr. Thomas Gann, well-known British archaeologist, announced the discovery on arrival in New Orleans, after three months "in the bush" of Quintana Roo, in eastern Yucatan.

A tip from a chiclero, a chicle gatherer for a chewing gum company, led Dr. Gann and his party to the site, 12 miles from Tzibanche. The ruins spread over an area of about 15 by 20 miles, and may be, Dr. Gann believes, the most extensive ruins ever reported in the Mayan land.

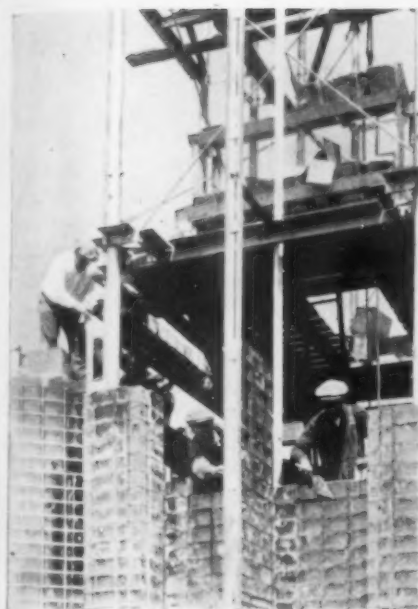
"The district is a stupendous expanse," said Dr. Gann. "It is almost literally covered by hundreds of mounds, beautiful plazas, walls, circular forts, all fairly well preserved."

Some of the mounds are handsome piles of elaborately cut stone. There are four great temples of carved stones still standing. These are more than 140 feet high. Evidences of dwelling houses of the common people can also be seen, Dr. Gann said.

This heretofore unknown center of Mayan civilization was occupied during the late Mayan period, between 600 A. D. and 1200 A. D., the explorer stated.

Dr. Gann was accompanied on the expedition by his wife and nine native assistants.

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LAYING GLASS BRICKS

This is the way the glass block building at Chicago's Century of Progress exposition was erected. Working with the new material, five masons laid 25,000 glass "bricks" in 12 days of eight hours each. The 50-foot tower which rises above the body of the unusual structure glistens with sunlit color in the day and is a pillar of illumination at night.

ASTRONOMY

Invisible Radiations Lag in Variable Stars

VARIABLE stars, which shine brightly for a given period and then become dimmer for a time, have a second and invisible variability, at least in certain types of such stars. Studies disclosing this invisible variability were described before astronomers attending the meeting of the American Association for the Advancement of Science in Chicago by Dr. Edison Pettit and Dr. Seth B. Nicholson, of the Mount Wilson Observatory of the Carnegie Institution of Washington.

Drs. Pettit and Nicholson have trained exceedingly sensitive instruments, attached to telescopes, on a number of variable stars of one special type. They have discovered that although such stars get hotter as they grow brighter, and cooler as they grow dimmer, nevertheless when the total amount of radiation, visible and invisible, is measured, the time of maximum radiation is found to lag appreciably behind the time of maximum brightness.

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ASTRONOMY

Crescent Moon Meets Venus

**On 24th of This Month This Beautiful Sight May be Seen
In Early Evening; On 9th Moon Passes Close to Saturn**

By JAMES STOKLEY

THE DISPLAY of planets, which has been foreshadowed during recent months, has now reached its height in the evening. Every one of the five naked eye planets, Mercury, Venus, Mars, Jupiter and Saturn, can be seen in the evening sky during the month, though not all of them are well enough placed to be indicated on the accompanying maps. In addition, the summer constellations are now shining in all their glory, so that this month offers a splendid opportunity to become acquainted with the celestial bodies.

Mercury, nearest of all the known planets to the sun, is the least often seen of the five mentioned above. It is so close to the sun, only 36 million miles away (as compared with 93 million for the earth), that it never passes far out of the overpowering glare of that body. Once in 88 days it makes a revolution in its orbit around the sun, but the earth is also revolving around the sun, once in 365 days, and in the same direction. The result is that every 116 days the sun, Mercury and the earth are in the same relation to each other. Once in that period, Mercury is seen farthest to the west of the sun. This is called "greatest western elongation." Then it is seen low in the eastern sky just before the sun rises, after which the glare makes it invisible.

Next it passes around behind the sun, to reappear about ten weeks later on the eastern side, which is called "greatest eastern elongation." Mercury is in this position on July 2, and then it will be low in the west for about an hour and a half after the sun descends. It will be of the .8 magnitude, so if you have a clear western horizon, and a keen eye, you should have little difficulty in finding it on this date, or a day or two earlier or later. A pair of opera glasses will assist in detecting it.

The planet Venus, next in order from the sun, will be in the same part of the sky, and even brighter, but lower and farther north. During the rest of

the month it will rise higher and higher in the evening sky, at the same time increasing in brightness, so if you cannot locate it on the same date as Mercury, watch for it later. Its magnitude, on the fifteenth, is minus 3.3, far brighter than any star or other planet in the sky.

Next planet, of course, is our own earth, but one doesn't need to wait until evening to see it! The next that appears in the sky is Mars, and it is in the constellation of Virgo, the virgin, setting about three hours after the sun on the fifteenth.

Mars Has Faded

Because of its great distance from the earth, it has faded from the brilliance that it had earlier in the year, and is now of magnitude 1.1, which is, however, far brighter than all but a few of the stars. Its red color, and steady glow, so different from the twinkling stars, make it easy to locate as it shines in the southwestern sky.

Jupiter, largest member of the sun's family of planets, is the next in order, and it can be seen these July evenings to the right of Mars, almost directly west. It is considerably brighter than Mars, or indeed, than any planet except Venus, and, being higher in the sky, it remains visible after Venus has set. It is in the constellation of Leo, which, at

the time that the maps show, has half descended behind the western horizon.

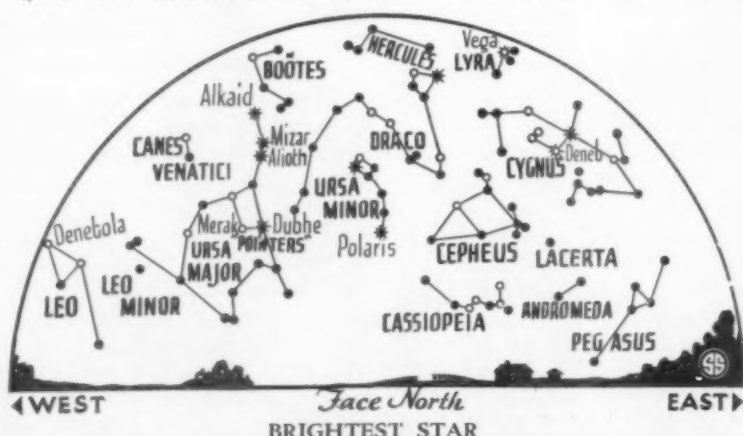
Saturn, most distant of the naked eye planets, and famous for the system of rings surrounding it, is now coming into view after months of invisibility in the evening sky. It rises in the east about an hour after sunset, and is in the constellation of Capricornus. About nine o'clock on an evening in the middle of the month, it can be seen low in the southeast, as indicated on the map. Its magnitude is .5, which is very brilliant, though greatly inferior to either Venus or Jupiter.

During the month the moon goes through its regular phases as follows: On the seventh it is full, rising at sunset and visible through the night. It is at last quarter on the fourteenth, when it rises at midnight. New moon comes on the twenty-second, when it is invisible, but a few days afterwards the slender crescent can be seen low in the west. Finally, first quarter comes on the twenty-ninth, when it is directly south at sunset and remains visible through the evening. Thus, one desiring moonlight evenings will find them from the beginning to about the ninth of the month, and again at the end, from about the twenty-fifth to the thirty-first.

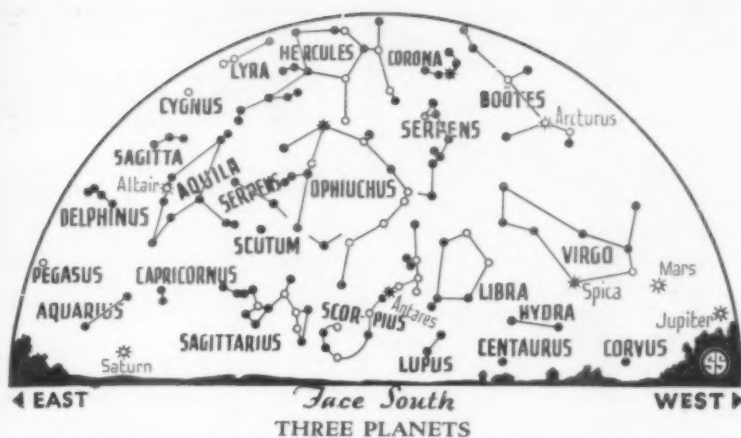
To Pass Saturn

On the twenty-fourth the crescent moon will pass close to the planet Venus, making an interesting spectacle in the western sky in the early evening. On the ninth it will pass close to Saturn.

* * * SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS



The brightest star visible this month is the beautiful Vega, in its easily found triangle high in the north.



This map shows the location of three of the planets visible to watchers of the evening sky this month. As Saturn rises in the East, Jupiter and Mars are sinking in the West. The twisting tail of the distinctive summer constellation Scorpius is shown directly south.

At about 7:30 p. m., eastern standard time, the planet will be less than the moon's own diameter to the north, but then it will not be easily visible. When the planet and moon come into view, however, they will still be close together, especially for observers in the eastern part of the country. Those farther west will not have moonrise until correspondingly later, and by that time the planet and our satellite will have separated even more.

Moon to Hide Star

In the early morning hours of July 5, the moon will pass in front of a star known as tau Scorpii, in the constellation of Scorpius, the scorpion. The star is of the 2.8 magnitude, easily visible to the naked eye, but it will not be so conspicuous when close to the brilliant moon. With slight optical aid, such as a pair of field glasses, the occultation, as such a phenomenon is called, should be easily seen.

Six first magnitude stars decorate the July evening sky. In the eastern sky almost overhead is the constellation of Lyra, the lyre, in which we find the brilliant Vega, brightest of the stars now visible. Below Lyra is Cygnus, the swan, which is sometimes called the northern cross, from the arrangement of the stars that constitute the group. The cross is now horizontal. The northernmost star in the cross is Deneb, another of the six, though much fainter than Vega. To the south of Cygnus is a brilliant star, Altair, which marks Aquila, the eagle. Directly south is Scorpius, already referred to, in which there is a brilliant star of distinctly red color. This is Antares, and it is supposed to mark

the scorpion's head. The animal's long tail curves down and to the left.

High in the western sky is Bootes, in which we find first magnitude Arcturus, the light from which, after a journey of 40 years, was used a few weeks ago to inaugurate the Chicago Century of Progress Exposition. Lower, and in the southwest, is Virgo. Besides temporarily containing the planet Mars, Virgo has a bright star, Spica, which is to the left of the planet.

In the northern sky, Cassiopeia, shaped like the letter W, is near the horizon. Hanging in the northwest by the end of its handle is the great dipper marking Ursa Major, the great bear. The pointers are the two lowest stars in this figure, and continuing from them to the right you can locate the pole star, Polaris, which is approximately at the position of the north pole of the sky. It is only approximate, however, for the true pole, the point of the sky directly above the earth's north pole, is more than twice the moon's diameter away from the pole star.

Hundred Thousand Stars

Directly overhead is Hercules, which contains no very bright stars. However, it does contain one very remarkable object which can be seen under the most favorable conditions with the unaided eye as a faint patch of light but for which a telescope is required really to appreciate. This is the so-called "great cluster in Hercules," a globular swarm of perhaps a hundred thousand stars, each comparable in size with our own sun. Its distance is so great, however, that its light takes about 36,000 years to reach us, and it is so vast that a beam of light takes 320 years to cross it. The

immensity of these distances can be realized when it is recalled that light travels seven times around the earth in a single second! A number of such clusters are known, but this one is the most famous.

On July 2 there occurs an astronomical event which produces no striking visible effects in the sky. On that date the earth is in aphelion, at a greater distance from the sun than at any other time in the year. After that the earth will approach closer to the sun until next winter. Despite the greater distance, however, this is the warmest time of year because now the sun's light, and heat, fall most directly on us in the northern hemisphere. In the winter time, even though the sun is closer, the sun's rays strike at a slant, and the same amount of heat is spread over a greater area, which more than compensates for its nearness.

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ZOOLOGY

"Demon Frog" Brought To National Museum

ROCK-DWELLING frogs of Puerto Rico, dreaded as demons by the natives who, however, have never seen them, have been brought to the U. S. National Museum here by Gerritt S. Miller, Jr., recently returned from a West Indian collecting trip.

The "guajone," as the frog is called, won his fearsome reputé among the Puerto Ricans by his resounding voice, which echoes and re-echoes from the wild mountain gullies where he lives. Some of them say he is not a living creature at all, only a voice; others pictured him in fearsome terms as over a foot long and armed with terrible teeth, when they tried to dissuade Mr. Miller from his quest.

But the museum scientist persisted, and finally found his guajones in boulder-filled mountain caves where the going was hard and somewhat dangerous. He located them with the aid of a flashlight, and dislodged them from their crevice habitats with a twig.

Once he had them safely bottled they appeared ordinary enough frogs, the biggest of them less than two inches long. The most distinctive feature about them was their eyes, which he says stuck out like "mouse-ears."

Oddly enough, these frogs dislike the water, and if they fall into it get out as quickly as they can.

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PHYSIOLOGY

Electrical Instruments Used To Study Currents in Brain

ELECTRICAL instruments so delicate that they will register a millionth of a volt are being used to explore microscopic areas of the brain, Prof. C. Judson Herrick, of the University of Chicago, told the American Association for the Advancement of Science. Information thus obtained is expected to revolutionize our whole knowledge of the way the human mechanism works.

"I venture the prediction that the electro-biological era now beginning will yield as revolutionary changes in our conceptions of the physiology of the nervous system as the invention of the microscope inaugurated in anatomy," Prof. Herrick said.

There are from ten to fourteen billion nerve cells in the cerebral cortex—the part of the brain with which we think—and they are arranged in definite patterns. It is the little electric currents that flow from cell to cell and from group to group that the new electrical methods are measuring.

This new knowledge of inter-cell telegraphy in the brain promises to yield positive results in understanding differences in behavior between man and his evolutionary cousins, the higher apes, and among the human races themselves, that the older methods, which depended on the study of the grosser features of the brain, could only block out roughly.

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METEOROLOGY

Summer, Though Young, Already Breaking Records

THOUGH the summer is still very young, this year's hot season has already made a record for itself, according to reports of the U. S. Weather Bureau at Washington, D. C.

There was abnormally hot weather in a large part of the north while frost has visited regions much farther south, J. B. Kincer, chief of the Climate and Crop-Weather Division of the Weather Bureau, pointed out. In the middle of June a large region centering around the Dakotas suffered from an average temperature of fifteen degrees above normal for a whole week. At the same time cool weather brought an average of nine degrees below normal to a

large part of the east with frosts as far south as the Shenandoah Valley of Virginia.

Drought was coupled with heat in the north central part of the country and also extended over practically all the south. It is most unusual for so many states to lack rain at the same time, Mr. Kincer explained.

He said he did not recall a week during which as little rain fell over the whole country as that which ended on June 20. The rainfall map for those seven days shows about half the country, mostly the Mississippi Valley, without a drop of precipitation. He explained that there had been scattered local rains, but that large regions as a whole were very dry.

Science News Letter, July 1, 1933

PHYSICS

Magnetic Device Knocks H From Matter

FOR THE FIRST TIME in history H has been knocked out of matter by artificial means.

The H in this case stands for hydrogen. The ejection of a proton, or hydrogen heart, from a collision between a heavy-weight hydrogen atomic heart and a carbon atom, reported to the American Association for the Advancement of Science by Prof. E. O. Lawrence of the University of California, is considered an important step forward in our knowledge of the constitution of matter and its relation to energy.

Prof. Lawrence, with his unique "merry-go-round" magnetic device for accelerating atomic projectiles, hurled some of the newly discovered double-weight hydrogen atoms at carbon of mass twelve. The carbon gained one unit of mass, or weight, and a hydrogen atom of ordinary weight was expelled in the form of a proton. One and a half million volts was fed into this synthesis and seven and a half million volts were emitted, a large release of energy.

About two decades ago Lord Rutherford in England was the first to perform an atomic synthesis and knock H out of matter. He used the streams of helium atomic hearts, or alpha particles, that are released in the radioactivity of radium and other elements. Prof. Lawrence's success in performing synthetic transmutation of a heavier element out of a lighter one with significant release of energy is an important new development.

Science News Letter, July 1, 1933

IN SCIENCE

PHYSICS

Atomic Bombardment Breaks Up More Elements

NEW SUCCESSES in a new method of element transmutation were announced by Dr. J. D. Cockcroft, young physicist from Britain's famous Cavendish Laboratory to the American Association for the Advancement of Science.

The idea that atomic particles have warlike properties and can force themselves into the hearts of atoms led to atom smashing that released very large amounts of energy. Lord Rutherford's first transmutations two decades ago were atom building without energy release.

Dr. Cockcroft first turned lithium and a projected hydrogen heart into two helium atoms. Now he announced the disintegration of boron into three helium atoms, the breaking up of fluorine into oxygen and helium and the change of beryllium into lithium and helium when bombarded with hydrogen.

Science News Letter, July 1, 1933

MEDICINE

Fungi Infect Lungs Causing Symptoms Like Tuberculosis

THIRTEEN different fungi which may infect the lungs and cause symptoms like those of tuberculosis were described at the National Tuberculosis Association meeting.

These fungi can be roughly divided into three classes, Dr. David T. Smith of Duke University, Durham, N. C., said. The three classes are the yeast-like fungi, mold-like fungi and the higher bacterial forms.

Dr. Smith recommended treating all types of fungus infections with large doses of potassium iodide, beginning with one drop of a saturated solution three times a day and working up to sixty drops three times daily. Patients who do not respond to this treatment are given in addition ethyl iodide inhalations.

Science News Letter, July 1, 1933

THE FIELDS

HOME ECONOMICS

Best Designs Not Followed In Clothes for Children

APPARENT indifference and an astonishing lack of knowledge on the part of designers as to the relationship between clothing and the physical development of the young child was charged in an address before the American Home Economics Association, by Ellen Miller of the Merrill-Palmer School of Detroit.

Miss Miller declared that manufacturers, merchants, and buyers should be aware of such information as scientific tests have produced.

"Well-designed clothing contributes to the child's growth in self-reliance and to his mental and physical health," she stated.

Further investigation of suitable garments for children is needed, the speaker said, urging that most teachers can make experiments. Teachers can collect the experiences of parents or nursery school teachers with children's clothing for different ages, she explained.

Science News Letter, July 1, 1933

PSYCHOLOGY

Intelligence May Be Increased By Education

THE IDEA held by many modern psychologists that your intelligence is something fixed and not to be changed by education or environment was condemned by Dr. Frank N. Freeman of the University of Chicago in speaking to the Conference on Research in Child Development held in Chicago by the National Research Council.

"It is at least conceivable that intellectual training may improve intelligence, as it has been defined," Dr. Freeman said. "The pace of mental operations may very well be influenced by practice, and mental alertness probably varies considerably with appropriate training."

Ability to concentrate the attention, to think effectively, to avoid fallacies, and to grasp difficult relationships between thoughts, are among the other

aspects of intellectual ability which Dr. Freeman declared could be improved or controlled by proper education.

Intelligence tests given to children of defective parents who were adopted into superior homes, to children of the same family adopted into families of differing advantages, and to identical twins who had been brought up separately, give results showing that the intelligence of adults in the home and the type of education do have considerable effect on a child's mental ability. Not only does he increase in knowledge when given advantages of proper training, but his ability to learn is also increased.

There is no such thing as intelligence apart from training, Dr. Freeman said.

"Ability is always a composite of the two, and the belief that they can be separated by means of tests is an illusion."

Science News Letter, July 1, 1933

MEDICINE

Wandering Spleens May Cause Illness

WHEN THE SPLEEN gets wanderlust and strays from its normal place in the body, it may cause acute illness with pain, nausea and vomiting like an attack of appendicitis, Dr. Arvin Abell, Louisville, Ky., surgeon, told members of the American Surgical Association.

The spleen plays a role in the final disposition or destruction of the red blood cells. Normally this organ is located in the upper left part of the abdomen. But sometimes it wanders from this spot and may be found located any place in the abdomen.

The condition of wandering spleen is predominantly an ailment of young women. Out of ninety-five cases, which were all Dr. Abell could find recorded, as this is a rare complaint, ninety were women. The exact cause is not known. Dr. Abell thinks the condition exists at the birth of the individual, but is not discovered until later when it causes acute illness. In his two cases, the spleen had twisted on its stem, shutting off the blood supply.

The remedy for the ailment is removal of the spleen. Fortunately, this organ can be easily dispensed with. The difficulty is that physicians are not apt to recognize the symptoms as due to a wandering spleen because the trouble seems to be so remote from where the spleen normally would be.

Science News Letter, July 1, 1933

PHYSIOLOGY

Brain Adjusts Man to Extremes of Weather

MAN'S SUPERIOR brain makes it possible for him to live in a world of extreme kinds of weather and other varying conditions, Prof. James Barcroft, the British physiologist, told the American Association for the Advancement of Science.

The highly evolved brain of the human being holds unconscious control of his blood's chemistry and physics. The resulting constancy of his blood conditions make him relatively independent of heat, cold and other changes in the outside world that hamper the lives of his less fortunate lower animal kin.

In the evolution of life, as pictured by Prof. Barcroft, efforts of the lowest organisms to make themselves more at home in the world were at first aimed merely at so arranging their own lives that outside conditions would be less hard on them. They did not make much progress at changing and controlling their own internal conditions.

Higher in the evolutionary scale, Prof. Barcroft believes that the first steps toward internal regulation were chemical. Then control by the nervous system began to assert itself until finally the brain became dominant in maintaining the continuing uniformity of the blood.

Science News Letter, July 1, 1933

PUBLIC HEALTH

Pictures on Paper Reduce Cost of X-Raying

THE COST of detecting tuberculosis in high school pupils was cut in half by the use of paper X-ray pictures, Dr. H. R. Edwards of New Haven, Conn., told the National Tuberculosis Association.

The paper X-ray photographs replaced celluloid films for tuberculin tests. They were said to be equal in quality to the celluloid X-ray films and they could be handled much faster and with less eye strain on the physician examining them.

The total cost of detecting 960 cases out of 6,393 examinations and referring them to the family doctors, including the cost of the paper X-rays which were paid for by the parents, was \$6,255. The actual cost per case was \$6.51.

Science News Letter, July 1, 1933

MEDICINE

Identical Twins Help to Upset Theory of Deafness

FIVE DIFFERENT pairs of identical twins who gradually became more and more deaf were described by Dr. George E. Shambaugh, Jr., of Chicago, speaking before the American Federation of Organizations for the Hard of Hearing.

Identical twins offer important aid in the study of progressive deafness, Dr. Shambaugh declared. Such twins develop from the same ovum, which divides and develops independently. Therefore the twins share any hereditary factor exactly equally. If heredity is the all-important factor in the development of otosclerosis, a form which progressive deafness sometimes takes, then loss of hearing should come on at the same age in each and it should run an identical course and lead to exactly the same degree of deafness.

In four sets of twins whose deafness was reported, this career of deafness did run parallel in each twin. But a fifth set of twins had a different history.

Describing these twins, whose case upsets medical theory, Dr. Shambaugh said that they are women, 41 years old, one single and the other married. They are easily mistaken for each other. Their mother, father and three sisters all had progressive deafness. But one twin began to lose her hearing at 14 years and now has a considerable defect, while the other first noticed trouble at 30 and now has only slight hearing loss.

"This is a pair of apparently identical twins with otosclerosis running a different course in each," Dr. Shambaugh stated. "Here, for the first time, we have definite evidence that there is some other factor besides heredity responsible for the development of otosclerosis."

"By comparing the differences in their life experiences we may get a clue to what this factor is."

More cases of identical twins with progressive deafness are sought by Dr. Shambaugh in his study of the causes of this disease.

Science News Letter, July 1, 1933

O. Lawrence, in which lithium was bombarded with heavy hydrogen, and the Paris experiments of Dr. Irene Curie and Dr. G. Joliot, in which lithium was bombarded with helium, also satisfied the Einstein theoretical relation of mass and energy.

The new weighing of the neutron allowed Dr. Bainbridge to conclude it is just slightly lighter than the light hydrogen atom. Its weight is 1.0065 while hydrogen's weight is 1.00778.

Science News Letter, July 1, 1933

GENERAL SCIENCE

Summer School in Jungles Planned by Scientists

A SUMMER school offering college credit for study of tropical subjects, located not in the cool mountains of the North but in the heart of Central American jungles, is a project being considered by a group of scientists who left New Orleans for a trip into the wilds of Honduras.

The party is under the direction of Dr. Austin R. Middleton, biologist of the University of Louisville, and Dr. H. E. Enders, dean of Purdue University's School of Science. They plan to spend two months near the Lancetilla experiment station not far from Tela, Honduras.

Collections will be made of biological specimens for the two universities, and a study will be made of reptiles and amphibians, as well as of parasites, fungi and medicinal plants that make their home in the tropical woods.

Science News Letter, July 1, 1933

PHYSICS

Weighing New-Found Atoms Proves Einstein Was Right

FROM the latest atom smashing comes proof that Einstein was right when, years before he introduced relativity, he formulated the law that mass and energy are interchangeable.

Using the world's largest mass spectroscopic, a kind of atom analyzer, Dr. K. T. Bainbridge, of the Franklin Institute's Bartol Research Foundation, Swarthmore, Pa., weighed with extreme accuracy the newly discovered heavy-weight hydrogen and the two varieties of lithium atoms. He explained to the American Association for the Advancement of Science conclusions that might be drawn from this research.

The atoms weigh only about one millionth of one millionth of one millionth of one millionth of an ounce, and Dr. Bainbridge's mass-measuring spectroscopic with its two-ton magnet

weighs them to an accuracy of one part in ten to thirty thousand. He used these weights in computations based on atomic disintegration experiments made at Cambridge's Cavendish Laboratory, at the University of California and at Paris during the past year.

Dr. J. D. Cockcroft, present at the meeting, was delighted to learn that the atom rearranging he did with Dr. E. T. S. Walton in Cavendish Laboratory last year upholds the Einstein law. Hydrogen hearts of protons were hurled at atoms of lithium isotope seven, and two alpha particles, or helium nuclei, flew off. Dr. Bainbridge's figures show that the mass lost was transformed into energy as the Einstein law requires.

Similarly Dr. Bainbridge showed that the California experiments of Drs. G. N. Lewis, M. S. Livingston and E.

One kind of dinosaur, the triceratops, had a head so big that it made up about one-third of the animal's entire body.

BETWEEN the STARS



an address by

R

Prof. Otto Struve

A

Director of the Yerkes Observatory of the University of Chicago, Williams Bay, Wis.

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To be given Friday, July 7, at 1.45 p. m. Eastern Standard Time over stations of the Columbia Broadcasting system. Each week a prominent scientist speaks over the Columbia System under the auspices of Science Service.

CHEMISTRY

Chromium and Uranium

"A Classic of Science"

One Was Named for the Beautiful Colors of its Salts,
The Other for the Newly Discovered Seventh Planet

Chromium

ANALYSIS OF THE RED LEAD OF SIBERIA; with Experiments on the new Metal it contains. By Citizen Vauquelin. (Memoir translated from the Journal des Mines, No. xxxiv). In Nicholson's Journal of Natural Philosophy, Chemistry and the Arts. Vol. II, London: 1798. This is an exact reprint of extracts from this original publication.

THE FOSSIL known by the name of red lead was discovered in 1770, by M. Pallas, in the gold-mine of Beresof, near Ecatherineburg in Siberia, in the form of four-sided prisms, with or without pyramidal terminations, of a beautiful orange red, commonly fixed in a quartzose matrix to which they so strongly adhere as not to be detached without difficulty.

All the specimens of this substance which are to be found in the several mineralogical cabinets in Europe were obtained from this gold-mine; which indicates, that it was formerly abundant; but it is said, that for some years past it has become very scarce, and that at present it is bought for its weight in gold, especially if pure and regularly formed. The specimens which do not possess the regular figure, or are broken into fragments, are appropriated to painting, in which art this substance is of high value for its beautiful orange yellow colour, its unchangeableness in the air, and the facility with which it can be levigated with oil. . . .

The beautiful red colour, transparency, and crystalline figure, of the Siberian red lead soon induced mineralogists and chemists to make enquiries into its nature. The place of its discovery, its specific gravity, and the lead ore which accompanies it, produced an immediate suspicion of the presence of that metal; but, as lead had never been found in possession of the characteristic properties of this Siberian ore, they

thought, with justice, that it was mineralized by some other substance; and Lehman, who first subjected it to chemical analysis, asserted, in a Latin dissertation printed at Petersburg in 1766 (I suppose 1786), that the mineralisers were arsenic and sulphur.

In 1789 Citizen Maquart undertook a long course of experiments, in which I had the advantage to participate, as he has been pleased to mention in the introduction to his work entitled *Essais de Mineralogie du Nord*. The object of these experiments was to determine the nature of the mineraliser of red lead. We sought in vain for the presence of arsenic; but, by an error, arising from the state of chemical knowledge at that time, we considered the red lead ore as a combination of super-oxygenated lead, iron and alumine.

Since that time Bindheim affirmed, that he had found it to contain molybdic acid, iron, nickel, cobalt, and copper.

From the consideration of these results, so diametrically opposite to each other, and under the encouraging consideration of the immense progress of chemical science since the renovation of its language and the rectification of its theory, and venturing likewise to place some dependance on the slight experience I have acquired in the art of essaying since I had the advantage of belonging to the establishment of mines, I thought proper to submit this substance to a new examination. My labours have not been without their recompense; and I hope to prove, in the following paragraphs, that all which has hitherto been asserted with regard to the mineraliser of the Siberian red lead is entirely destitute of foundation; that it contains neither arsenic, as Lehman pretended; nor the molybdic acid, and the three or four metals, announced by Bindheim; nor iron nor clay, as a Maquart and myself imagined; but a new metal, possessing properties entirely unlike those of any other metal. . . .

When an unknown substance is to

be examined, the only method to ascertain whether it has been better described, is to examine its properties, and compare them with those of other bodies; an operation which supposes a knowledge of all that has been before described in natural history. And when, after an accurate comparison of the properties of the body under examination with those of other bodies, it is found that none of these last exhibit the whole of those properties, a fair conclusion may be formed that the body is unknown, and consequently that it is new.

After this point is determined, it becomes necessary, in order to make it known to others, that its distinctive characters should be clearly ascertained, and a name given to it, for the purpose of brief designation, and of inscription in the catalogue of human knowledge.

This name may be derived from various sources;—the place whence it was obtained, the author who discovered it, or the specific properties it possesses, &c.; but it is easy to see that the two first sources are vicious. In fact, the name of the place seems to announce that the substance is to be found exclusively there; and it is very far from being known, at the early period of discovery, whether it may not be found elsewhere. The name of the author teaches nothing, except that such a man was the discoverer, a circumstance of little interest to science. But the name of a substance deduced from its leading properties is truly useful, because it brings to mind, and in some measure places the object before the eyes by a faithful sketch of its attributes.

From these considerations I have thought fit to adopt the name *chrome*, which was proposed to me by Cit. Haüy, to designate the new metal found in the native red lead. In truth, this name does not perfectly agree with the complete metal, because it has no very distinct colour; and because, even if it had one, this would not be a sufficient reason, since every metal has a more or less peculiar colour.

But it agrees wonderfully well with its combinations with oxygen, which afford a green oxide, or a red acid, ac-

cording to the proportions of that principle, and because each of its primary combinations communicates its colour to all the secondary combinations into which it enters; properties which belong to it almost exclusively.

This name appears to me to be so much the better founded, as this substance has not yet been discovered except in the state of acid or oxide, and because it may perhaps never be found in the native metallic state.

Nevertheless, as I am not disposed to consider the adoption of one name rather than another as of any importance, provided the name do express some remarkable or distinctive property of that which it denotes, I shall with pleasure, if a better name be found, consent to substitute it instead of *chrome*.

Uranium

CHEMISCHE UNTERSUCHUNG DES URANTS, einer neuentdeckten metallischen Substanz; vom. Hrn. Prof. Klaproth. Chemische Annalen für die Freunde der Naturlehre, Arznei-gelahrtheit, Haushaltungskunst und Manufacturen; von Lorenz Crell. IX. 1789.

CHEMICAL INVESTIGATION OF URANIUM, a newly discovered metallic Substance; by Prof. Klaproth. In Chemical Annals for Friends of Natural History, Medical Science, Household Arts and Manufactures; by Lorenz Crell. IX. 1789. Translated for the SCIENCE NEWS LETTER by Helen M. Davis. This is a literal translation of extracts from this original publication.

AMONG the number of minerals of still unknown constitution, which hitherto, on this account, neither had nor could have a precise name nor a suitable place in the system, belongs the so-called Pitchblende from the mine of George Wahsfort at Johanngeorgenstadt. Misled by the name given to this ore by the common miner, it was formerly listed among the zinc ores, until Mr. Jns. Werner in Freyberg, to whom its cleavage, hardness and unusual weight gave sufficient proof that it could be no blende, put it with the iron earths, and named it *Eisenpecherz* (*ferrum ochraceum piceum*). Nevertheless doubt remained as to whether this were really a suitable place for it; and soon after this he brought out the suggestion that perhaps it might have as a constituent the metallic substance or the characteristic acid of Tungsten or Wolfram, combined with iron. This theory too will not last

long. According to an advice in the Bergmännischen Journal two students of metallurgy in Chemnitz have confirmed it by a scholarly piece of research; hence this ore is nothing but a kind of tungsten already sufficiently well known. But in the following results of my investigations this idea is disproved.

2. This ore, for which, for the sake of brevity, I will retain the old name of Pitchblende until, at the end of the present treatise, I will show the necessity for a new name, occurs in the above-mentioned locality, sometimes massive, sometimes interspersed with either stony or earthy material. The former dense variety is of a blackish color, inclining to steel gray, a moderate luster, solid, somewhat irregular, splitting into the smallest pieces like shale; it is quite opaque, possesses a moderate hardness, and upon grinding forms a black powder. Its weight is, on the average, 7,500. It is seldom entirely pure, one usually sees a lead-like part, of gray-white color and dull metallic luster, sprinkled through it in small concretions or as streaks and veins.

The second variety usually occurs in layers, with which are associated sometimes a soluble micaceous kind of rock, sometimes a brown hematite-like iron ore, in varying amounts, and usually also a peculiar yellowish and brownish earth; when it crystallizes in four-sided tablets the so-called green mica also appears. This variety is distinguished from the first by a purer black, here and there with a reddish shade, a stronger luster, not unlike coal, less hardness, differing in that the black color of the powder appears greenish. Also I noticed in some the natural outline marking out the place of fossils, a flat and slightly sunken surface. . . .

7. In order to learn the nature of the metallic base of Pitchblende, several experiments were made with a solution of it in nitric acid and aqua regia. First I tried to find out whether a reduction of the dissolved substance would take place in the wet way; but nothing was precipitated by zinc and iron rods placed in it, either in the cold or when heated.

Volatile liver of sulphur threw down the greater part of the Pitchblende out of the acid, with a brownish yellow color; at which the surface of the mixture was covered with a grayish-white, metallic-looking skin.

With tincture of gall-nuts no precipitate came down; but that formed, whose precipitation the acid hindered, came down as a chocolate brown precipitate

when just neutralized with an alkaline salt. . . .

[A long list of other experiments follows.—Ed.]

17. From these experiments it easily follows that this mineral substance belongs neither to the zinc ores nor to the iron ores, nor to the tungsten- or wolfram-containing minerals, moreover to none of the hitherto known mineral substance, but that it is a unique, independent, half-metallic substance in the system [of minerals]. It must consequently drop its present false names, as Pitchblende, Eisenpecherz, and must be given, on this account, a new, exclusive, specific name. Until the possible discovery of one still more fitting, I give it the name *Uranite*; which name I, after the example of the old philosophers, take from a planet, namely from the newest discovered, Uranus.

Science News Letter, July 1, 1933

PHYSICS—GEOLOGY

X-Rays Show Changes Under High Pressures

EARTH MATERIALS under extremely high pressures, such as they have to endure at considerable depths in the earth's interior, act structurally much as they would if subjected to high temperatures. This is one of the results of X-ray investigations of matter at high pressures reported by Dr. Willi M. Cohn of Berkeley, Calif., before the meeting of the American Physical Society in Chicago.

In a special apparatus, it has been made possible to attain pressures as high as 3,000 atmospheres or 45,000 pounds per square inch. Of course, to obtain such pressure it is necessary to make the metal walls of the cylinder thick and exceedingly strong. This would of necessity interpose a very difficult barrier to the passage of X-rays by means of which the materials under pressure are to be studied.

This difficulty is avoided by setting a window of beryllium, a very light but very strong metal, on the side where the rays are admitted. Opposite this window, on the "exit" side, is a second window of glass or bakelite. Behind this the photographic plate is placed. Photographs of the minute structure of the materials under study, made with X-rays both before and after the pressure is applied, give patterns from which it is possible to deduce the physical changes taking place.

Science News Letter, July 1, 1933

MEDICINE

Hardening of Brain Arteries Found Factor in Epilepsy

HARDENING of the arteries of the brain may cause epileptic attacks, Dr. Alfred Gordon of Philadelphia has reported to the American Psychiatric Association.

The exact cause of epilepsy has not been determined, in spite of extensive scientific study. Many factors seem to be involved. These are chemical, physiological, anatomical, psychological and even hereditary, it appears.

Seeking an organic basis for the development of the disease, Dr. Gordon examined the brains of patients who had suffered from arteriosclerosis, or hardening of the arteries as it is popularly known. These victims had also suffered from typical epileptic seizures after they had reached an advanced age, when the arteriosclerosis might have already developed, a study of the patients' histories showed.

Brain Membrane Thickened

In twelve such cases, the brains showed not only hardening of the arteries but inflammation and thickening of the membrane that covers the brain. The patients during their lives had all suffered from high blood pressure, headaches, dizzy spells, occasional epileptic attacks and transient attacks of paralysis of one or both sides which always completely cleared up.

The epileptic attacks could be considered as signs of a progressive material damage to the brain, in Dr. Gordon's opinion. This damage was produced by the sclerotic changes of the blood vessels in the brain. The seizure itself might be due to temporary lack of blood resulting from a spasm of the arteries, which is a common occurrence in arteriosclerosis. Or it might be due to a sudden flare-up of the inflammation of the membranes seen in the post mortem examinations.

Not Always

Dr. Gordon emphasized that he does not consider the organic damage to the brain the only cause of epilepsy. Nor does arteriosclerosis always lead to epilepsy, he pointed out, citing many cases of the former disease in which the patients never suffered attacks.

Another factor such as hereditary weakness or predisposition probably is present when the brain damage occurs that results in epileptic seizures, he suggested.

Science News Letter, July 1, 1933

PALEONTOLOGY

New Fossils May Represent Ancestors of Jellyfish

FOSSILS of an animal type described as a "floating hydrozoan," discovered in 500,000,000-year-old Early Cambrian rocks near Lancaster, Pa., by Dr. H. Justin Roddy, curator of the museum of Franklin and Marshall College, are believed to be close to the primitive ancestral stock from which was derived the great modern family of sea-dwelling animals that includes the corals, jellyfishes, sea-anemones and the Portuguese man-of-war. This family represents the third step from the bottom on the evolutionary ladder, with only the sponges and the protozoa below it.

It has long been assumed that these lowly creatures must have come into the world at an early geological date, but because most of the members of this family, especially the free-living, floating forms, have no limy skeletons or other hard parts that easily form fossils, very early rocks that show other life remains have hitherto failed to yield any traces of its members. Even the present fossils contain no part of the original animals, but consist entirely of imprints between thin layers of stone; these, however, are so perfect that their

nature is quite evident. Similar fossils recently found in Poland join these American specimens in testifying to the existence of the family half a billion years ago.

Most of the present-day relatives of this ancient fossil line spend their lives rooted to one spot, and some of these, notably the corals, have in later ages picked up the trick of strengthening their skeletons with lime. These ancestral forms had skeletons, but they were composed of the same kind of hard, horny stuff we find in the wings and shells of insects, called chitin.

Dr. Roddy has been sending specimens to the Smithsonian Institution for identification for many years, so he forwarded these fossils. They were identified for the Institution by Dr. Rudolph Ruedemann, State Paleontologist of New York, and are described in a new Smithsonian publication. The fossils constitute a new genus, which has been given the scientific name *Camptostroma*, which englishes, approximately, as "flexible framework."

Science News Letter, July 1, 1933

Dr. J. M. Aldrich of the National Museum tells of collecting species of flies in South Dakota about 1890 which were so rare that none have ever been found since.

The Weather Bureau's flood forecast service spreads its warnings by newspapers, radio, telegraph, telephone, even by messengers on foot or horseback if necessary.

The Milwaukee Zoo serves this dinner to a hippopotamus every day at four o'clock: 25 pounds of chopped alfalfa hay, two pounds carrots, five pounds beets, two pounds onions, 15 pounds bran bread, one pound bran, two pounds apples, half a pound of bananas.



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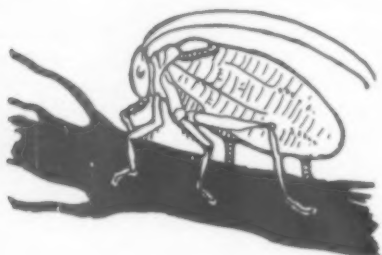
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NATURE RAMBLINGS

by Frank Thone

BIOLOGY



Breathing Without Lungs

MAN AND ALL his vertebrate kin above the level of fishes are lung-breathers. They take air into those elaborate sacs in their chest cavities, where the oxygen is transferred to the red blood corpuscles which in turn carry it to the points where it is needed by the laboring muscles, secreting glands, and feeling brain and nerve cells.

Nothing at all like this goes on inside the bodies of insects. They have no oxygen-carrying corpuscles in their blood. Insect blood is simply a medium of food transfer, like the plasma or fluid portion of human blood; the second function of oxygen carriage is entirely lacking.

Insects get the necessary supplies of air to all parts of their body simply by extending their breathing apparatus throughout their bodies. It is as though our lungs had branches that ran out into our fingers and toes, and all points in between.

This highly branched condition of the insects' breathing apparatus is materially helped by having many entrances and exits, instead of only one as in the air-breathing vertebrates. If you will look at the side of a large insect, such as a katydid or grasshopper, you will see a row of dots along it, one to each segment of the abdomen. These are the breathing pores, or spiracles. From each of them a thin-walled set of branching tubes runs to all neighboring parts of the body, carrying the needed air.

This curious system of piping air directly throughout the body has two notable effects on insect physiology. First, it makes the insect body exceedingly light for its bulk, which is a real advantage to an animal group which is primarily a flying and leaping order. The second effect is to limit quite sharply the practicable size of the organism. The biggest insects that have ever lived were the foot-long dragonflies of the Coal Age, the mouse-sized cockroaches that were their contemporaries, and the huge Goliath beetles of the modern tropics. Probably bigger insects cannot exist, because the penetration of air into the body through their peculiar direct-ventilation system would become physiologically ineffective after the first half-inch or so.

Science News Letter, July 1, 1933

Mystery Island in Quebec, the national domain camping site of Canadian Boy Scouts, has been made a bird sanctuary by the Canadian Government.

Plans are under way for building the longest bridge in Europe—a two-mile span to connect the Danish island Zealand with the islands of Lolland and Falster.

BACTERIOLOGY

Fermentation Frees Seed From Bacterial Disease

FERMENTING tomato pulp until the seeds drop out has been found to be an excellent method of freeing the seeds from the destructive disease, bacterial canker, which has presented a problem to growers of tomatoes for canneries.

The value of fermentation in this connection was discovered by accident, though scientific insight played a part in taking advantage of the chance discovery. H. L. Blood, of the U. S. Department of Agriculture, had some canker-infested tomatoes, from which he wanted to extract the seeds, so that he might try on them the effects of various disinfectants.

Lacking a modern power seed extractor, he fell back on the old discarded method of fermenting the seeds out in a vat.

When he planted the seeds from the diseased fruits he nevertheless got healthy plants. The results from untreated seeds were as good or better than those from disinfected seeds.

He repeated the experiment in Utah, where the disease has been destructive. Again the fermented seed from infected fruit proved free from the disease, while mechanically extracted seeds still carried the infection.

A more exact investigation is now under way, to determine if possible the factors in the fermenting vat that kill off the infection, and to determine also the conditions under which fermentation-treated seeds can be produced best.

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MEDICINE

Hope For New Treatment Of Addison's Disease

HOPE that Addison's disease may be attacked by a new form of treatment, as a result of recent research on the hormones of the pituitary gland, was expressed by Dr. Herbert M. Evans of the Rockefeller Institute at the recent Congress of American Physicians and Surgeons.

This new treatment would not be mere replacement of the adrenal cortex hormone, lack of which results in Addison's disease. Replacement treatment, like giving insulin for diabetes, is already being used by doctors who give a very powerful extract of adrenal cortex to patients suffering from Addison's

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disease. A number of lives have been prolonged in this way.

The new treatment which Dr. Evans hopes will be possible will be designed to stimulate the vital cortex of the adrenal gland to function anew and itself to produce enough of the necessary cortin to save the lives of Addison's disease patients.

This renewed functioning of the adrenal cortex may possibly be brought about by giving a certain substance from another gland, the pituitary. Recent studies show that the pituitary produces a substance that exerts a profound influence on the activity of the vital cortex of the adrenal gland.

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ARCHAEOLOGY

Court For Prehistoric Ball Games Found

DISCOVERY of a prehistoric ball court, where Mayan athletes played their ancient version of the American national sport, is reported by William T. Broughman of Marion, Indiana, who has just returned from explorations in Yucatan.

Mr. Broughman, who is a graduate of Indiana State University and describes himself as a "full fledged amateur" in archaeology, reported the find at Tulane University's Department of Middle American Research. Officials of the department said that the discovery affords new proof of their conviction that the ball game Poktapok was the Mayan national sport.

Mr. Broughman made his discovery while wandering over ruins of the ancient Mayan city of Kabah. Though the court is badly in ruins, he was able to trace the outline well enough to be sure of its identity.

Ball games, played with rubber balls long before Europe heard of rubber, were important events in the daily life of ancient Mexico. Early explorers from Spain observed the games with eager interest and told of honors heaped on the most skilful of the Indian athletes.

Dr. Frans Blom of Tulane has been gathering evidence to trace the origin of the game which Mayas and Aztecs so enjoyed. He is convinced that Mayan Indians who made so many other contributions to native civilization, were inventors of the game, which spread over Mexico.

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ARCHAEOLOGY

Seven Mummies From Texas Cave Brought to Smithsonian

See Front Cover

SEVEN mummies preserved apparently by natural dryness of the Texas cave where they were buried, have just been received by the Smithsonian institution. The mummies shed new light on the prehistoric cave dwellers of the Big Bend region of Texas whose cave shelters have been explored in recent years by Dr. Frank Setzler of the Smithsonian.

Among the seven bodies is one almost perfectly preserved. Its expression is almost life-like and the hands are crossed in a peculiar fashion under the head. Even the original method of hair dressing remains. The body was buried upright in a deep deposit of wood ashes, wrapped in a rabbit skin robe. A basket was placed over its head.

Besides the mummy-like remains, some bundle burials also were in the cave. These consist of disarticulated

bones, and represent a fashion of burial known to some groups of Indians.

Nearly all the skeletons had fractured legs or arms which had healed without benefit of setting. Since the cave where the burial was found is on the edge of a steep cliff, some 150 feet above the river plain, it is thought that the ancient people suffered frequent falls with broken bones the result.

The bones, together with basketry, sandals, arrow heads and other objects, are from a cave on the property of Mrs. Fate Bell in the canyon of the Pecos River. It was stated at the Smithsonian that Mrs. Bell's interest and willing cooperation have preserved the cave from looting by amateurs and for study by competent anthropologists. The material has been turned over to Dr. Setzler for intensive study.

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alike both as to numbers and distribution of values. Dr. Millikan sees these experimental results fitting in with his suggestion of a few years ago that the cosmic rays arise from a "clustering of hydrogen atoms into cosmic ray dust" in the depths of space and then an occasional sudden formation of helium atoms, oxygen atoms, an iron atom or even a uranium atom, releasing in these atomic syntheses the penetrating radiations that seem to pervade all space.

Dr. Aston's atomic mass measurements and deductions show that, if helium is made from hydrogen, twenty-seven million volt-electrons in energy are released. For oxygen, iron and uranium formation, the energy releases are figured at one hundred, five hundred and two thousand million volt-electrons, respectively.

Since a few of the cosmic rays have energies of over two thousand million volt-electrons, Dr. Millikan suggests the synthesis of highly unstable and transitory elements heavier than uranium, the heaviest discovered, but that these elements then disintegrate radioactively into the kinds found in the stars and on earth. Thus Dr. Millikan sees synthesis, instead of annihilation, as

playing an important part in the universe, admittedly a happier prospect for those who like to visualize the universe a going concern in the future.

Astronomers, as Dr. Millikan observed, are now abandoning the idea that the heat energy of the sun and stars comes from annihilation of the mass of atoms and are beginning to favor the idea that natural upbuilding of atoms within stellar bodies keeps them shining. With the origin of cosmic rays similarly explained by interstellar catastrophic formation of atoms, synthesis instead of disintegration or annihilation would play a major role in the universe.

Of the radiant energy rushing about the universe, the cosmic rays, totally unknown a few decades ago, are by far the most important. For Dr. Millikan deduces with astronomical estimates that the universe's total radiant energy in the form of cosmic rays is from thirty to three hundred times greater than that existing in heat, light and all other forms combined. Of the imports of energy received by the earth, the cosmic rays equal about one-half of the total energy coming in from the stars.

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•First Glances at New Books

Chemistry

ANNUAL SURVEY OF AMERICAN CHEMISTRY, 1932, Edited by C. J. West—*Chemical Catalog*, 346 p., \$4. For the seventh consecutive year this National Research Council sponsored volume summarizes progress of American chemistry in a manner of great assistance to those engaged in research or industry. Each of the twenty-seven summary chapters is written by an authority and the literature references to researches cited are conscientiously complete.

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Geology

IGNEOUS ROCKS AND THE DEPTHS OF THE EARTH—Reginald A. Daly—*McGraw-Hill*, 598 p., \$5. Geologists will not need to be told that the publication of a new book by Daly on geotectonics *ipso facto* necessitates an order to their booksellers. Frankly not a book for beginners, it is none the less a necessity for anybody who has carried his interest in geology beyond the elementary stage. The presentation is full and complete, the diagrammatic illustrations well-chosen and clear.

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Astronomy—History of Science

EARLY ASTRONOMY AND COSMOLOGY—C. P. S. Menon—*George Allen & Unwin, London*, 192 p., 10s. Mr. Menon with technical astronomical knowledge and a peculiar aptitude for interpreting the Eastern mind, developed the hypothesis and convincing argument that the numbers 4, 12, 28, 60 and others which perpetually recur in all the ancient cosmological systems originate in a mathematical, not an astronomical necessity. He has reconstructed a square or rectangular cosmology, in which the pyramid replaces the bell as the vault of heaven. This cosmology seems to have been common to ancient Egypt, China, Vedic India and Chaldea.

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Radio

WHAT TO READ ABOUT RADIO—Levering Tyson—*University of Chicago Press*, 30 p., 25c.

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Mathematics

INTRODUCTORY MATHEMATICS—John Wayne Lasley and Edward Tankard Browne—*McGraw-Hill*, 439 p., \$2.75. Material for an introductory course in collegiate mathematics is contained in

this volume written by the professors of mathematics at the University of North Carolina. The graph is introduced early and is used consistently throughout the book. And the fact that algebra, trigonometry, and the calculus are brought within the limits of one volume will make this book useful for those who wish to refresh their knowledge.

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Geography

ECONOMIC AND SOCIAL GEOGRAPHY—Ellsworth Huntington, Frank E. Williams and Samuel van Valkenburg—*Wiley*, 630 p., \$3.75. The influence of geographic factors upon man is considered from a number of interesting and provocative points of view: climate, soil, types of agriculture and other industries, direction and volume of trade streams, etc. The book is especially well adapted for class use, but it also makes interesting reading for the person whose class days are over.

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General Science

THE STORY OF EARTH AND SKY—Carleton and Heluiz Washburne in collaboration with Frederick Reed—*Century*, 368 p., \$3.50. Nine year olds and older are fortunate that this book, authoritative and readable, is available, ready to answer their questions about the earth and sky. There is the chance that boys and girls reading this story will receive a better introduction to science than they would through considerable instruction in the average school room. The authors are pioneers in the progressive education movement and they have cooperated with a supervisor of elementary science. The healthy mental attitude of the book is themed in the following quotation: "You need not try to believe everything that is in this book. It tries to tell you the truth. But what, today, we think is true, some one will learn more about tomorrow. When we started to make this book, there were only eight worlds like our earth that any one knew about. Then another was discovered and the book had to be changed."

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General Science

THE NEW LEARNING—Edited by F. J. E. Raby—Ivor Nicholson & Watson, London, 333 p., 8s 6d. Ten Scholarly Englishmen make "a contribution to a general view of the world" for the average man. Dr. S. Chapman contributes a chapter on "The Physical Universe," Dr. E. W. MacBride writes on "Biology," Dr. W. Brown explains "The Human Mind," while Dr. H. Dingle covers "The Sciences and Scientific Method." Chapters are also devoted to history, social institutions, the arts and aesthetic theory, philosophy and theology. As a summary volume to present day viewpoints, it will appeal to the serious reader.

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Biology

BIOLOGY AND HUMAN WELFARE—J. E. Peabody and A. E. Hunt—*Macmillan*, 658 p., \$1.60. A new edition of one of the best-known and most successful of biology texts for secondary schools. It has been thoroughly worked over, and supplied with many new illustrations, so that it constitutes practically a new book.

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General Science

INTERNATIONAL CRITICAL TABLES OF NUMERICAL DATA, PHYSICS, CHEMISTRY AND TECHNOLOGY, INDEX—National Research Council—*McGraw-Hill*, 321 p., \$7. With the publication of this index volume the seven volumes of the National Research Council's International Critical Tables become far more useful and accessible.

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Physics

COLLEGE PHYSICS—Arthur L. Foley—*Blakiston*, 759 p., \$3.75. A textbook of college grade written by the professor of physics and head of the physics department of Indiana University.

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Standard:

AMERICAN STANDARDS YEAR BOOK, 1932-1933—*American Standards Association*, 44 p., free.

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